their arrival in the city, have induced me to include this among my successful inoculations.

From the evidence adduced in the preceding pages, I conclude that while yellow fever is incapable of propagation by its own unaided efforts, it may be artificially communicated by inoculation, and only becomes epidemic when such inoculations can be verified by some external natural agent, such as the mosquito.

The history and etiology of yellow fever exclude from our consideration, as possible agents of transmission, other blood-sucking insects, such as fleas, etc., the habits and geographical distribution of which in no wise agree with the course of that disease: whereas, a careful study of the habits and natural history of the mosquito shows a remarkable agreement with the circumstances that favor or impede the transmission of yellow fever. So far as my information goes, this disease appears incapable of propagation wherever tropical mosquitoes do not or are not likely to exist, ceasing to be epidemic at the same limits of temperature and altitude which are incompatible with the functional activity of those insects; while, on the other hand, it spreads readily wherever they abound. From these considerations, taken in connection with my successful attempts in producing experimental yellow fever by means of the mosquito's sting, it is to be inferred that these insects are the habitual agents of its transmission. It cannot be denied, however, that other such agents may and probably do occasionally occur, but not being endowed with the same facilities for rapid and extensive operation, their influence becomes insignificant as compared with the action of the Cuban culex.

THE LOCAL TREATMENT OF PSEUDO-MEMBRANOUS CROUP: INTUBATION OF THE LARYNX.

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ARMSTRONG, in his quaint old book on *Diseases of Children*, reprinted in 1783, and dedicated to Queen Charlotte of England, states that he was often "shocked and mortified" at his want of success in treating hydrocephalus internus, but had he lived in New York during the last twenty-five years, he would soon have learnt to regard the result of his treatment of hydrocephalus internus with stoical indifference, so much more frequently would his sensitive nature have been "shocked and mortified" by his ill success in treating croup, and yet I believe that by bringing to the notice of the profession the solvent power of trypsin, the safety and efficiency of certain of the stronger alkaline solutions, used by inhalation, by intubation of the larynx and trachea to relieve the dyspnœa, and by the early performance of tracheotomy where other measures fail to give relief, as much has been done in New York, during the last ten years, to relieve the hapless victims of this disease from impending death and death after extreme suffering, as in any other portion of the world.

Alkaline inhalations have been in common use in the treatment of croup, as far back as the recollection of the oldest physicians extends. This treatment is rational, and is based on the clinical fact that alkalies have a solvent effect on fibrin, of which pseudo-membranes largely consist. The vapor arising from slacking lime, or from boiling lime-water, has been so long used that it is associated in the mind with cases of croup. But water takes up only a small quantity of lime, so that, although the room occupied by the patient be filled with its vapor, but little lime is inhaled. The recommendation of late years to increase the alkalinity and, therefore, the efficiency of lime-water by adding to it an alkali, as sodium bicarbonate, has been successfully carried out in practice.

Another agent recently brought to the notice of the profession as a solvent of pseudo-membrane, is the digestive ferment trypsin. Unlike pepsin, which has likewise been employed for the same purpose, it exerts its solvent action in an alkaline medium. For a knowledge of its efficiency as a solvent of pseudo-membranes, we are indebted to chemists, but the attention of New York physicians was first directed to it by Dr. Van Syckel, of Harlem. It is obtained in the shops, prepared by chemists in the form of a powder, insoluble, or but slightly soluble in water, and it is employed for inhalation held in suspension in the medium used. When asked how to treat a case of membranous or diphtheritic croup before it has reached the stage which requires surgical measures, I know no better method than the constant or almost constant inhalation from the steam atomizer of the following:

℞.—Trypsin	q. s.
Sodii bicarbonat.	ʒij.
Aquæ calcis	℥vj.—Misce.

As much trypsin should be added to the alkaline mixture as can be held in suspension without clogging the tubes of the steam atomizer, and it will be found that considerable trypsin may be inhaled in this way in a short time. The only objection to this agent is its expensiveness, so that poor families may sometimes find it difficult to obtain it in sufficient quantity for continuous use during a day or two.

The result in the treatment of croup by inhalation depends to a great extent upon how early it is commenced. In my opinion, croup can not infrequently be prevented by persistent alkaline inhalations employed as soon as the least huskiness of voice is observed. A physician attending a case of diphtheria should, each day, notice the character of the voice or cry of the child, and if there be the least hoarseness or departure from the normal clearness of its voice or cry, and he recommend the use of alkaline inhalations from the steam atomizer, I believe that the slight laryngeal catarrh which is a forerunner of croup may in a considerable number of instances be removed, and the disease be prevented. I seldom attend a case of diphtheria without observing at each visit the character of the voice, and I frequently make the child cry or cough that I may better learn the condition of the larynx. But if these first slight symptoms pass unheeded, and inhalations be not used at the proper moment, and the pseudo-membrane form upon the laryngotracheal surface, we all know how ineffectual inhalations are to check the disease, and save life. Frequently croup occurs at the commencement of diphtheria, and is its earliest and chief manifestation, and the physician is not summoned to the case until the obstruction in the air-passages is fully formed, and the nature of the attack is recognized by the family. Under such circumstances, inhalations will not save life, nor will they do more than perhaps retard in a measure the progress of the disease. One important benefit from inhalation is that it renders the muco-pus thinner and more easily expectorated, the result largely of the watery vapor inhaled, and not entirely of the alkaline solvents employed, although they probably liquefy the thin films of fibrin which are present with the muco-pus.

I must here protest against another mode of treatment, which is designed to act locally, which has been extolled in some of the journals, and which has been practised in this city. I refer to the use of pilocarpine. The theory of those who recommend its employment in diphtheria is that by the abundant secretion from the surface of the air-passages which it causes, it produces detachment of the pseudo-membrane, while it renders the secretion more liquid. But it must be remembered that the expectoration of the bronchial secretion is difficult in membranous croup on account of the obstruction produced by the pseudo-membrane, so that pilocarpine is likely to cause a rapid filling up of the bronchial tubes, an increase of the dyspnœa, and sudden death with symptoms very similar to those produced by suddenly developed œdema of the lungs. I have witnessed this result, the bronchial tubes suddenly filling with the secretion and the patient dying with symptoms of extreme dyspnœa, although a few hours previously he seemed to be in a favorable state.

Much of the success in treating croup by local measures depends upon the apparatus employed. Great assistance has been afforded by the steam atomizer, which without overheating the room, and without the need of a tent to cover the patient and exclude the air, which he so greatly needs, takes the place of the pans and pails and heated bricks and irons to produce the necessary alkaline vapor, appliances which the older physicians remember that all of us formerly used. The instruments employed in tracheotomy have been so improved, modified, and increased in number since Trousseau brought forward his canula with two concentric tubes, that surgeons possess all that is required to render this operation as far as possible successful. But one of the most important inventions bearing on the local treatment of croup has been recently announced in this city.

The profession of America is indebted to the New York Foundling Asylum, in consequence of the opportunities which this large institution affords, for the differentiation of rötheln from roseola and from measles, and its recognition by us as a distinct disease of a constitutional nature; but a much greater benefit has been conferred by the Asylum, and entirely through the genius and perseverance of Dr. O'Dwyer, in the construction of the laryngeal tubes, and in demonstrating their usefulness in relieving the dyspnœa of croup, in prolonging life, and rescuing from fatal asphyxia a considerable proportion of the cases of croup.

In September, 1858, M. Bouchut, of Paris, read before the Academy of Medicine in that city, a paper entitled "A New Method of Treatment of Croup by Tubage of the Larynx." In this paper the author relates two cases in which he had practised intubation. Both patients were temporarily relieved of the dyspnœa by this operation, but both subsequently died. One lived thirty-six hours with the tube in the larynx, breathing easily during this time, and dying from blood poisoning. The other patient had a return of the dyspnœa some hours after the insertion of the tube, and the house physicians performed tracheotomy without the presence or knowledge of Bouchut, and without disturbing the tube in the larynx, which remained *in situ* forty-eight hours without inconvenience. The tube employed by Bouchut was less than an inch in length, and in the diagram resembles a thimble of small diameter with both ends open. Its upper end when in position lay between the two vocal cords. Bouchut closes his paper with the statement of the following facts, which he believes are established by the above cases. The translation is a free one:

1. The ease with which we can practise tubage of the glottis by means of a canula fastened upon the inferior vocal cords and not hindering the functions of the epiglottis.

2. The tolerance of the canula by the larynx.

3. The possibility of relieving the dyspnœa of croup, and of other diseases of the larynx by this means in preference to tracheotomy.

4. The facility with which large pseudo-membranous concretions formed in the trachea and bronchial tubes are expelled through the intraglottic tube.

5. The utility of this new resource (tubage) for physicians who prac-

tise in small localities without helpers and far from assistance, since little aid is required in introducing the tube.

Unfortunately Bouchut attacked tracheotomy, attempting to show by statistics that the number of deaths from croup is increased by this operation. Trousseau at that time was the great champion of tracheotomy. He had invented his tracheal canula with two concentric cylinders, essentially the same as that in common use. It is natural for one that is struck to strike back, and Trousseau, seeing his pet operation assailed, attacked what he believed to be a new heresy promulgated by Bouchut, with all his power, with statistics, argument, and ridicule. A committee was appointed, with Trousseau at its head, to report on tubage of the larynx for the relief of croup. As might be expected, the committee unqualifiedly condemned tubage and recommended tracheotomy.

The debates which occurred on this subject in the Imperial Academy of Medicine, in which prominent physicians of Paris participated, are interesting at this time. They may be found in the *Gazette des Hôpitaux* for 1858. More than a quarter of a century has elapsed since these debates, and tubage of the larynx had been forgotten as a means of relieving the dyspnœa of croup, until it was revived by Dr. O'Dwyer, although in Bouchut's treatise on *Diseases of Children* one page is devoted to this subject, in which the statistics of seven cases are given, but without a very favorable result.

Intubation of the larynx, as practised by Dr. O'Dwyer, was original with him. He had invented the tubes, and he had performed the operation many times in the New York Foundling Asylum, when his attention was called by the writer to the work of Bouchut in the same direction, and it is only recently that he has seen the report of the memorable debates in the French Academy. He had been four or five years modifying and improving the instruments employed, availing himself of the ample opportunities which the Foundling Asylum afforded for observing the effects of intubation, before this mode of treating croup was announced in the medical press. The tubes of O'Dwyer differ very much from those of Bouchut, and O'Dwyer's last tubes differ very much from those first employed, so many are the alterations he has made in them during the last five years.

Intubation of the larynx has been performed so many times according to O'Dwyer's method, and his tubes, which extend the whole length of the larynx and trachea to within half an inch of the bifurcation, have been so much improved, that there can be little doubt that this operation will not meet the fate which awaited it when performed and recommended by Bouchut. On the other hand, intubation is destined, I think, to be employed more generally than tracheotomy, both in this country and in Europe, since it is so much more simple. The following facts may be considered established by the statistics of intubation, the number of cases in which it has been performed for the relief of croup being now quite large:

1st. The tube can be inserted in the fractional part of a minute, and it can be removed in less than a minute. The operation causes little or no pain, and it requires only the assistance of a competent nurse to hold the child and steady its head. Contrast the simplicity of this operation with trachéotomy, which M. Sanné says should not be undertaken without the help of three intelligent and efficient assistants, at least one of whom should be a physician.

2d. In all cases in which the obstruction is limited to the larynx and trachea, intubation relieves the dyspnœa as quickly, effectually, and permanently as does tracheotomy.

3d. When inhalations and the proper medicinal treatment do not relieve croup, and dyspnœa begins, intubation is required. This will, in most instances, give complete relief for a time. If the respiration subsequently become embarrassed, and no benefit occur from cleaning the tube, tracheotomy may be required. Intubation may properly precede tracheotomy in most cases.

4th. Physicians have long known that the mortality from croup might be considerably diminished by the early performance of tracheotomy, and much suffering be prevented, but most parents will not consent to the performance of so severe an operation till the dyspnœa becomes extreme, and measures designed to give relief are urgently required. Not a few parents, in the middle and lower classes, allow their children to die rather than consent to this operation. On the other hand, few parents, I think, will object to intubation, and when they see the relief which it produces they will probably consent more readily to tracheotomy if the dyspnœa should return. If only one of these operations be performed, statistics thus far show nearly as good a result from intubation as from tracheotomy. In the New York Foundling Asylum, during the last year, intubation has been performed in twenty-five cases of membranous croup, with six recoveries. This institution has charge of about 2000 children, three-fourths of whom are "farmed out" in families in the city, and when they contract serious disease they are returned to the Asylum. With such a class of patients it must, I think, be admitted that a better result would not have occurred from tracheotomy.

5th. Now that diphtheria has become so common in this country, and epidemics of it occur in villages and country towns, with, probably, as large a proportion of cases of croup as in the cities, it seems to me, with Bouchut, that the country physician should be provided with the necessary instruments for intubation whenever diphtheria appears in his locality. Alkaline and trypsin inhalations, properly and almost constantly used, and intubation performed early, when the patient begins to suffer from dyspnœa, would probably prevent the necessity of tracheotomy in a large proportion of instances. But if such treatment do not fully relieve the dypnœa, it will, I think, in most instances, so diminish it and retard the progress of croup, that the physician, remote from help and unfavorably situated for the performance of tracheotomy, will have ample time to prepare for this operation. We repeat, that intubation may prevent the need of tracheotomy, but if it do not, it presents no hindrance to it. We have stated above that in one of Bouchut's cases the house staff, alarmed by the dyspnœa of a patient who was carrying the laryngeal tube, which had probably become obstructed, performed tracheotomy without disturbing the tube. The longer tube of O'Dwyer might, perhaps, serve as a guide in tracheotomy, but it can be quickly removed, if thought best, before the operation is commenced.

ABNORMAL VISUAL SENSATIONS.

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With increasing knowledge and improved methods of diagnosis, most of the cases formerly classed as amaurosis or amblyopia are now relegated to their proper position in the list of more definite diseases of the eye; but meanwhile slight errors of vision, which were formerly unheeded, have been brought into notice, some of them only within the last year or two. Amblyopia thus continues to be a generic term, including all cases of dull sight in which no distinct lesion of the eye can be discovered; it expresses, in a general way, the failure in function without indicating the pathological condition present. Subdivisions have been made according to the assumed cause of the affection; the assumption in some cases is supported by the strongest possible evidence, as in tobacco amblyopia; while, as more light is thrown upon the subject, the term hysterical amblyopia becomes less frequently used.

The essential symptom is a partial or complete absence of perception, either of objects or colors, in some part of the visual field; the function is impaired or modified. A normal visual acuity varies with illumination; it is certain, therefore, that some amblyopias will be much modified by the amount of light.

It is convenient to classify the cases according to the part of the visual field which is chiefly affected; but at the same time the evidence that has been derived from the pathological conditions present in those examined indicates that the position of the lesion is fairly constant for similar conditions of the visual field. In some a well-defined organic mischief